COS 226  
Milan Kruger

0494848123  
  
SUPER SERIOUS INTRO

I tested TAS, TTAS and Backoff locks and since they said I shouldn’t use a sample size of 1, I made it a whopping 100 to be EXTRA sure. Perchance.   
  
“THIS IS SCIENCE” – Sun Tzu 1924  
  
The tests consist of incrementing a counter and calculating the Fibonacci sequence. I then got the average time for each test.  
  
Time vs Number of Threads  
All the tests are from thread amount 1 to 15 (My pc couldn’t do 16 D:)  
  
This graph shows the locks being used to increment a counter from 0 to 100 000.  
  
  
  
  
This graph shows that Backoff’s performance is better in high contention scenarios compared to TAS that can experience a lot of false tests due to the frequent updates of the counter. This graph clearly shows that Backoff is better, so why is there still a debate about it?

This graph shows the locks used to compute the Fibonacci sequence up until the 15th digit.

The 15th digit is 610. The Fibonacci tests took over 30 minutes to compute.  
  
  
  
This graph indicates that Backoff quickly escalates in an exponential manner. This makes sense, given that the backoff delay doubles after each miss. The recursive nature of the Fibonacci calculation likely causes the Backoff lock to experience frequent misses, resulting in rapidly increasing delay times.

But TAS and TTAS doesn’t use any additional delays in their checks thus it stays linear.

The normalized version of the Fibonacci test  
  
  
There are noticeable spikes at thread counts 6 and 11 for TTAS and a spike at thread count 14 for TAS. Unfortunately, I do not have the time nor brain power to find the reason behind these spikes.

Conclusion

### In conclusion, my tests show that you must consider different locks under various conditions. References

1. Infinite Loop. "Test-and-Set." Geidav's Blog. <https://geidav.wordpress.com/tag/tas/#:~:text=The%20Test%2DAnd%2DSet%20(,%2Dset%20(%20TAS%20)%20operation)>.
2. "Lock (computer science)." Wikipedia. <https://en.wikipedia.org/wiki/Lock_(computer_science)>.
3. "Test-and-set." Wikipedia. <https://en.wikipedia.org/wiki/Test-and-set>.
4. "Test-and-Test-and-Set." Wikipedia. <https://en.wikipedia.org/wiki/Test_and_test-and-set>.
5. "Exponential backoff." Wikipedia. <https://en.wikipedia.org/wiki/Exponential_backoff>.

My favourite joke.

There are 10 types of people in this world. Thos who understand binary and those who don’t.